

WHAT IS CLAIMED IS:

- 1 1. An implantable pressure sensing device, comprising:
2 a pressure sensor;
3 a pressure transmission catheter having a proximal portion, a mid
4 portion, a distal portion, a distal port, and a lumen extending therethrough, the proximal
5 portion of the catheter connected to the pressure sensor;
6 a pressure transmission fluid disposed in the lumen;
7 a barrier disposed proximate the distal port to retain the fluid in the
8 lumen; and
9 wherein the distal portion of the catheter has an inside diameter that
10 is larger than an inside diameter of the mid portion of the catheter.
- 1 2. An implantable pressure sensing device as in claim 1, wherein the
2 pressure sensor is connected to a telemetry unit.
- 1 3. An implantable pressure sensing device as in claim 1, wherein the
2 distal portion of the catheter is flared to define the larger inside diameter.
- 1 4. An implantable pressure sensing device as in claim 1, wherein the
2 distal portion of the catheter is counter-bored to define the larger inside diameter.
- 1 5. An implantable pressure sensing device as in claim 1, further
2 comprising a surface modification on an outside surface of the catheter.
- 1 6. An implantable pressure sensing device as in claim 5, wherein the
2 surface modification promotes tissue in-growth.
- 1 7. An implantable pressure sensing device as in claim 5, wherein the
2 surface modification prevents migration of infectious contaminants.
- 1 8. An implantable pressure sensing device as in claim 5, wherein the
2 surface modification improves a seal between the catheter and surrounding tissue.
- 1 9. An implantable pressure sensing device as in claim 5, wherein the
2 surface modification improves anchoring between the catheter and surrounding tissue.

- 1 10. An implantable pressure sensing device as in claim 5, wherein the
2 surface modification comprises a layer of material.
- 1 11. An implantable pressure sensing device as in claim 10, wherein the
2 layer comprises a tube.
- 1 12. An implantable pressure sensing device as in claim 11, wherein the
2 tube has a proximal end and a distal end, and wherein the tube is connected to the catheter
3 at only one of the proximal and distal ends.
- 1 13. An implantable pressure sensing device as in claim 1, wherein the
2 barrier comprises a gel, and wherein the gel is recessed back from the distal port.
- 1 14. An implantable pressure sensing device as in claim 1, wherein the
2 barrier comprises a membrane extending over the distal port.
- 1 15. An implantable pressure sensing device as in claim 1, wherein the
2 distal port is distal-facing.
- 1 16. An implantable pressure sensing device as in claim 1, wherein the
2 distal port is side-facing.
- 1 17. An implantable pressure sensing device as in claim 1, further
2 comprising a dissolvable material disposed in the distal port.
- 1 18. An implantable pressure sensing device as in claim 1, further
2 comprising a fill hole in a side wall of the catheter.
- 1 19. An implantable pressure sensing device as in claim 1, further
2 comprising a pair of protrusions extending from a side of the catheter to grasp tissue
3 therebetween.
- 1 20. An implantable pressure sensing device as in claim 1, wherein at
2 least a portion of the catheter is in the shape of a helix.
- 1 21. An implantable pressure sensing device as in claim 1, wherein the
2 lumen has a non-circular geometry.

1 22. An implantable pressure sensing device, comprising:
2 a pressure sensor;
3 a pressure transmission catheter having an open proximal end, a
4 closed distal end, and a liquid-filled lumen extending therethrough, the proximal end of
5 the catheter connected to the pressure sensor.

1 23. An implantable pressure sensing device as in claim 22, wherein the
2 pressure sensor is connected to a telemetry unit.

1 24. An implantable pressure sensing device as in claim 22, wherein the
2 catheter comprises a tube, and wherein the distal end of the catheter is closed by an
3 integral extension of the tube.

1 25. An implantable pressure sensing device as in claim 22, wherein the
2 catheter comprises a tube, and wherein the distal end of the catheter is closed by a sleeve
3 placed over the tube.

1 26. An implantable pressure sensing device comprising:
2 a pressure sensor;
3 a pressure transmission catheter having a proximal end, a distal end,
4 and a fluid filled lumen extending therethrough, the proximal end of the catheter
5 connected to the pressure sensor, wherein at least a portion of the outer surface of the
6 catheter has been modified to at least one of promoting tissue in-growth, prevent migration
7 of infectious contaminants, improve a seal between the catheter and surrounding tissue,
8 improve anchoring between the catheter and surrounding tissue, and improve
9 endothelialization.

1 27. An implantable pressure sensing device as in claim 26, wherein the
2 modification comprises an outer layer of material.

1 28. An implantable pressure sensing device as in claim 27, wherein the
2 outer layer of material comprises ePTFE.

1 29. An implantable pressure sensing device as in claim 27, wherein the
2 outer layer of material comprises polyester fabric.

1 30. An implantable pressure sensing device as in claim 27, wherein the
2 outer layer of material swells upon exposure to bodily fluids.

1 31. An implantable pressure sensing device, comprising:
2 a pressure sensor;
3 a pressure transmission catheter having a proximal portion, a distal
4 portion, a distal port, and a lumen extending therethrough, the proximal portion of the
5 catheter connected to the pressure sensor;
6 a pressure transmission fluid disposed in the lumen;
7 a barrier disposed proximate the distal port to retain the fluid in the
8 lumen; and
9 wherein the pressure transmission catheter containing the pressure
10 transmission fluid and barrier collectively act as a low-pass filter for frequencies above
11 50 Hz.

1 32. An implantable pressure sensing device as in claim 31, wherein the
2 pressure transmission catheter containing the pressure transmission fluid and barrier
3 collectively act as a low-pass filter for frequencies above 10 Hz.

1 33. An implantable pressure sensing device as in claim 32, wherein the
2 pressure transmission catheter containing the pressure transmission fluid and barrier
3 collectively act as a low-pass filter for frequencies above 5 Hz.

1 34. An implantable pressure sensing device as in claim 33, wherein the
2 pressure transmission catheter containing the pressure transmission fluid and barrier
3 collectively act as a low-pass filter for frequencies above 1 Hz.

1 35. A method of implanting a pressure sensor assembly, comprising:
2 providing a sensor assembly, the sensor assembly comprising a
3 housing, a pressure sensor in the housing, and a pressure transmission catheter extending
4 from the housing;
5 providing a trocar;
6 providing an introducer having a peelable sheath;
7 providing a retainer having a proximal handle and a distal plate with
8 a slot therein;

9 positioning the trocar in the introducer;
10 penetrating bodily tissue with the trocar and introducer such that a
11 distal end of the trocar and introducer reside in a body cavity where pressure is to be
12 measured;
13 removing the trocar from the introducer;
14 inserting the pressure transmission catheter into the introducer until
15 a distal end of the pressure transmission catheter resides in the body cavity;
16 positioning the retainer such that the distal plate rests against the
17 bodily tissue and the introducer resides in the slot; and
18 removing the introducer by peeling the sheath around the pressure
19 sensor assembly while leaving the pressure transmission catheter in place.